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SCIENCE NEWS LETTER

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A SCIENCE SERVICE PUBLICATION

UNIVERSITY

ENGINEERING

Meter Prevents Cave-Ins

A SUPERSENSITIVE gravity meter will be used in Philadelphia to detect holes under streets before the pavement caves in.

The instrument is so sensitive that cavities as small as 23 cubic feet, less than a cubic yard, have been detected. Yet the device can be operated next to a jack-hammer, although tests once were disrupted for a day by an earthquake in Alaska.

Developed by Texas Instruments, Inc., Houston, under specifications written by the Franklin Institute, the gravity meter is an answer to requests by the City of Philadelphia and gas and electric utility companies for a method of finding a cavity in the earth before the street caved in, or for finding unseen damage to utilities that might spawn a dangerous situation.

The instrument is based on the theory that a cavity, representing removal of an attracting mass, should be accompanied by a small but detectable decrease in gravity.

The meter has a small weight at the end of a delicate spring. Over a cavity, the gravity is slightly less; the spring thus contracts, and this is noted through use of a microscope. The instrument detects a change as small as four parts per billion of normal gravity.

It is a "long-period" instrument—meaning that the weight bobs up and down on its spring very slowly. This exempts the instrument from effects of rapid earth vibrations, such as produced by a jack-hammer, but slow earth vibrations, as from the Alaskan earthquake, do affect it.

The instrument is so sensitive that buildings, changes in elevation, and the sun and moon all produce measurable changes in gravity. Even simply moving 400 feet along a north-south street alters the reading 26 scale divisions because of the change in latitude.

All those changes, however, are gradual. A sudden, big change tips off the user that a cavity is underfoot.

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MEDICINE

Helmets Protect Drivers

HELMETS may make auto drivers and passengers look like Buck Rogers, but coupled with seat belts, their use would practically eliminate facial and brain fractures in auto accidents.

Auto accidents are the major cause of facial fractures requiring plastic surgery, Dr. Reed O. Dingman of the University of Michigan Medical School, Ann Arbor, said. Safety equipment would significantly reduce these, he told colleagues at the meeting of the American Society of Plastic and Reconstructive Surgery in Miami Beach, Fla.

He pointed out the front passenger in a car is most likely to fracture the bones of the middle portion of his face—nose, cheekbones, or upper jaw—as he is thrown forward in a crash against the instrument panel or the rear view mirror. On the other hand, the driver is more likely to injure his lower jaw.

To prevent deformity from developing in such an injured face, Dr. Dingman suggested that the surgeon align and fix the facial fractures by internal wiring as soon as possible. Otherwise, delayed treatment, poor healing or the occurrence of infection may cause a defect which needs later correction by refracturing and repositioning of the bones, or by bone and cartilage grafts.

Dr. Dingman said that although a patient's own tissue was still the best material for facial reconstruction, bone and cartilage preserved in banks had been successfully used during the past five years. More effective methods of preservation and sterilization of human tissue, including the use of cobalt as a sterilizer, are now being employed at University Hospital, Ann Arbor, he said.

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CHEMISTRY

"Sniffer" Challenges Nose

A MECHANICAL "sniffer" is challenging the delicacy of the human nose.

This sniffer can distinguish between types of whiskey on the breath, natural and artificial flavors, good and bad essential oils, and cigar and cigarette smoke, Dr. D. A. M. Mackay of Evans Research, New York, has reported.

The human nose has long been considered the most sensitive detector of aromas and flavors. But this machine is even more sensitive. It will help research chemists identify ingredients in oils from flowers and plants. With this information, the scientists can then develop synthetics for use in milady's perfumes, co-worker Dr. A. J. P. Martin, Nobel Prize winner from Herts, England, said.

The process is also said to be effective in the odor-flavor research areas, the field of quality control, and in research for plastics, paper, medicine and pharmaceuticals.

The "sniffer" is actually a series of ionization detectors teamed up with gas chromatographs. This means that a few cubic centimeters of vapor surrounding an aromatic material are fed into a column that separates the components. At the other end, an ionization detector signals the presence of each material as it comes from the column.

Gas chromatography is being used today for such problems as the determination of the more than 60 components in cigarette smoke, and the composition of coffee aroma, which numbers over 50 compounds, the scientists said.

Aroma is the most important single element in flavor. It is a composite of psychological responses to smell, taste, texture, appearance and sound. Manufacturers of food, flavorings and beverages are extremely interested in this aspect.

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AGRICULTURE

White Leaf Disease Menaces Rice Crop

INTERNATIONAL RESEARCH is keeping tabs on a potentially serious plant disease in the United States.

Ever since 1956 when "hoja blanca" (pronounced "o-ha blanka") "white leaf" disease of rice was first recognized as a virus disease in the Western Hemisphere, it has been a threat to the rice fields of Arkansas, Texas, Mississippi, Louisiana and California where the grain is a major crop.

So far the small outbreaks in Florida, southern Mississippi and southeastern Louisiana have all been effectively controlled by destroying infected crops, Dr. John G. Atkins of the U. S. Department of Agriculture's Beaumont, Tex., station told SCIENCE SERVICE. Dr. Atkin reported on the hoja blanca research to the American Phytopathological Society meeting in University Park, Pa.

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ENGINEERING

More Jobs Than Men Is Picture for Engineers

THE COLLEGE engineer market, subject to the fickle swing of the employment pendulum, will be getting a good picking over by industry in the early 1960's when demand for engineering graduates will exceed supply.

The Engineering Manpower and Scientific Manpower Commissions reported that industries intend to step up recruitment of engineering graduates. By 1963, about 12 engineers will be sought for each ten recruited in 1959. By 1966, the demand will be 15 for every ten. The demand will be even higher in the electrical equipment, research and development, aircraft, and communications industries.

The increased demand will come at a period when the number of engineering graduates will be declining. Early figures already point to a drop in freshman engineering enrollment in 1959, indicating the 1963 class will be even smaller.

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PUBLIC HEALTH

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V.A. Probe Urged

Thousands of veterans are receiving medical care to which they are not entitled, according to one investigator's findings. This should be investigated, he suggests.

MORE THAN half the patients in Veterans Administration hospitals are free-loading on American taxpayers.

Dr. Amos R. Koontz, a Baltimore surgeon, advised colleagues to support measures that would pressure Congress into an investigation of VA activities in the fields of medicine and surgery. His report appears in the *Current Medical Digest* (Dec.).

"It is manifestly unfair for veterans who are ill with non-service-connected disabilities to expect free medical care in Veterans Hospitals," he states. They are receiving such care at the expense of all taxpayers and many other veterans who are too proud to accept free benefits, he points out.

More than 113,000 patients are treated each day in Veterans Administration hospitals or in hospitals that are paid for such care, VA data show. Reports from the Government's fiscal year 1959 reveal that total patient cost was $739,000,000.

Patients in VA hospitals suffering from disabilities not connected with their military service cost $464,903,000, more than half of the total. Patients with service-connected disabilities cost less than half of that, $201,000,000. The remaining $71,000,000 was spent on care of patients with ailments that resulted from service-connected disabilities.

Approximately 44% of all VA patients are being treated for illnesses that directly or indirectly resulted from their tour of duty. The remaining 56% of all patients are treated for disabilities not connected with the service. These include tuberculosis patients and elderly veterans suffering from chronic old age diseases, patients considered not financially able to afford a private hospital, and a few non-military personnel.

Dr. Koontz reminds colleagues that there is a good chance Congress will be especially economy-minded next session. He urged them to act now. He further asks them to prod the state medical societies to request that the American Medical Association ask for a Congressional hearing.

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BIOLOGY

Nucleic Acid Studies Shed Light on DNA and RNA

A UNIFIED theory of heredity and virus infection may be a step closer because of tests indicating that two essential life chemicals differ more than previously believed.

The two chemicals are the nucleic acids RNA (ribose nucleic acid), which controls cell protein production, and DNA (deoxyribose nucleic acid), the material the genes are made of.

Dr. Saul Kit, a biochemist at the University of Texas M.D. Anderson Hospital, Houston, Texas, has found evidence that tumor cell RNA is composed of single-stranded molecules, while DNA is two-stranded.

Dr. Kit's analyses of nucleic acids of normal and cancer cells from humans and animals tend to confirm the previously held belief that DNA is two-stranded. Heating and cooling DNA splits the hydrogen bonds that bind the two twined strands together.

However, evidence indicates that RNA is composed of only a single segmented strand, because heating does not split either the whole RNA molecule or its segments.

The scientist now believes that gene DNA serves as a frame on which RNA is manufactured. The RNA then migrates outside the nucleus, takes up residence in the cell's cytoplasm and there produces the enzymes and other proteins that govern the size, shape, chemical function and behavior of the cell.

RNA, he believes, may be the mechanism by which genes transmit the information that defines the inherited traits of the cell. The theory may help to explain how viruses composed of RNA and viruses composed of DNA could have similar effects on the cell.

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RADIO FREQUENCY EXPEDITION—A team from the National Bureau of Standards' Central Radio Propagation Laboratory encounter bad weather on a glacier in northern Canada as they measure the complex conductivity of ice over the radio frequency range from 20 to 200 kilocycles. This expedition is illustrative of many that are made to remote places by CRPL personnel in the NBS program of radio propagation research.

PHYSICS

Balloon Flights Will Carry Large Scientific Package

TWO GIANT balloons to be launched from an aircraft carrier in the Caribbean late in January will carry the largest scientific package yet sent to such a high altitude.

The balloons are expected to reach an altitude of 18 to 22 miles and to remain aloft for about 48 hours with their payload of some 2,500 pounds each. Sheets of pure emulsion somewhat similar to that used in photographic film will make up 800 pounds of the scientific package.

The emulsion blocks are especially designed to record primary cosmic rays or nuclear particles that achieve energies as high as 10,000 billion electron volts (Bev). The project is sponsored by the National Science Foundation and the Office of Naval Research. Fleet support will be provided by the Navy, which has named the launching operation Skyhook 60.

The balloons with the unprecedented volume of ten million cubic feet each will be sent up from the general vicinity of the West Indies. The overall scientific program is known as Project ICEF, for International Cooperative Emulsion Flights, because about 25 universities and other research institutions are participating. The scientific work is under the direction of Prof. Marcel Schein of the University of Chicago.

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PSYCHOLOGY

Secret Ingredients Lend Value to Product

WHEN AN advertiser on television or radio tells you his product contains—and then identifies the ingredient only by mysterious letters and numbers, he is attempting to endow his product with a value which it really lacks.

The psychological reason for this was explained to the American Psychoanalytic Association in New York by Dr. Alfredo Namnum of Yale University department of student mental hygiene.

This technique of advertising is similar to gossip, he explained. Gossip does not, as it pretends, pass around important secret information. When the gossiper requires the listener to pledge secrecy, she is only trying to create excitement with something which is basically boring and indifferent, Dr. Namnum said.

Secrets are also kept, and especially by governments, in the unconscious belief that secrecy confers power. The powerful often claims exclusive rights to secrecy and tries to dispossess the weak of the secrets which he jealously guards. This inequality is sometimes necessary, Dr. Namnum admitted, but it is often carried unnecessarily too far.

The right to secrecy and privacy is very vital for the individual, he said. When the individual is completely deprived of information (when things that he needs to know are kept secret from him) he does not tolerate it as well as it may appear.

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VIROLOGY

Live Virus Polio Vaccine For Hemophiliacs

LIVE VIRUS oral polio vaccine has been delivered to a U. S. Air Force base to prevent any danger of bleeding from inoculations with regular polio vaccine.

Dr. Albert Sabin of the University of Cincinnati received a request for his oral polio vaccine from Capt. John P. Conley of the Air Force hospital at Wright-Patterson Air Force Base, Dayton, Ohio.

Dr. Conley requested the vaccine for use among members of two families suffering from hemophilia. A person suffering from hemophilia has a tendency, usually hereditary, to bleed continuously from a slight wound.

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ASTRONAUTICS

TV Robots May Build First Space Station

REMOTELY CONTROLLED machines that watch their hand-like parts with television eyes may build the first platforms in space.

Dr. Fred L. Whipple of the Smithsonian Institution's Astrophysical Observatory, Cambridge, Mass., reported to the Office of Naval Research that these machines would work much as remote manipulators now used to handle radioactive materials behind lead shielding in atomic energy laboratories.

The "telepuppet," as he called it, would have a little feedback on handling pressure to give the human operator a feel of the object the machine is working on.

These robots are likely to be the first real workers in space because space suits would be cumbersome and might rip or tear as a man worked. Space suits also would be subject to punctures by small meteors.

"Man is needed in space, presumably, because he can exercise judgment and also because he cannot be jammed by radio countermeasures," Dr. Whipple said. "But he does not have to be out working in a space suit."

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ROCKETS AND MISSILES

Army's Solid Missile Fuel Is "Shut Off"

A WAY TO "SHUT OFF" the solid fuel motor of the Army's new Sergeant artillery missile has been developed.

Brakes, in the form of air-drag fins that spring out at just the right moment, now impart the kind of pinpoint accuracy to this missile as has been obtained in liquid fueled rockets using fuel shut-off valves. This was revealed at Aberdeen Proving Ground, Md., by Robert J. Parks, Sergeant Project Director at the California Institute of Technology's jet propulsion laboratory.

Although the burning time of a solid fuel rocket can be calculated roughly, actual burn-out time may vary from predictions, sometimes by only fractions of seconds. To compensate for these variations, which can thwart accuracy, drag brakes in the form of fins or vanes can be extended or retracted from the Sergeant missile. This happens automatically at the precise time to correct the missile's path to its target.

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PUBLIC HEALTH

Doses of Sulfate Counter Radiostrontium

POISONOUS strontium in radioactive fallout from atomic bombs can be counteracted by doses of sulfates, if man responds as dogs do in experiments at Johns Hopkins Medical School.

Research reported by Drs. Mackenzie Walser, John W. Payne and Ann A. Browder to the American Cancer Society shows that sulfates cause animals injected with strontium to excrete in urine five to 20 times as much radioactive strontium as they normally would.

The sulfate infusions might be used therapeutically in the case of a laboratory accident or massive amounts of strontium in radioactive ash such as befell Japanese fishermen a few years ago, but they would not be useful in the gradual piling up of strontium in bones in normal fallout.

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TECHNOLOGY

Foresee Address-Reading Machine for Post Offices

A $114,000 CONTRACT for development of an address-reading letter sorting machine has been awarded by the U. S. Post Office Department in Washington to Farrington Manufacturing Company, Alexandria, Va.

The contract calls for the machine to read printed or typewritten addresses on envelopes, and sort them at a minimum rate of 10,000 letters an hour to at least 40 destinations. The transistorized prototype is to be ready by mid-1961.

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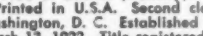

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NUTRITION

Pica Reflects Poor Diet

PREGNANT women who eat strange foods—such as clay and cornstarch—may unknowingly be making up for missing vitamins and minerals in their diets.

Although some researchers have considered these weird food cravings, or pica, as simply "cultural phenomena founded in superstition" and kept up by tradition, there is now more evidence the unusual foods are providing important nutrients.

A study of some 86 women in rural Alabama, described in *Nutrition Reviews* (Feb., 1960), indicates clay supplies missing iron and calcium while cornstrach contributes calories. The women, grouped as pregnant and nonpregnant clay-eaters, pregnant and nonpregnant cornstarch eaters, and, as controls, pregnant and nonpregnant women who ate neither, were rated according to whether their diets were excellent, good, fair or poor.

Generally, the diets of women eating the strange foods were considerably poorer than the control group. More than one-half the clay-eaters and one-third of the cornstarch-eaters had poor diets. In contrast, only 14% of the women eating normal foods were rated as having poor diets.

The preferred clay was light gray, usually obtained from river or stream banks although it could be purchased in some areas. Laundry cornstarch was consumed at an average weekly cost of some 15 cents. Interviews with the women brought out the fact that clay, usually eaten uncooked, was eaten at various times of the day. Cornstarch was eaten before meals. Some women ate as much as two pounds of cornstarch a day.

"Craving" and relief of nausea associated with pregnancy were among the reasons given for eating the clay and cornstarch. When deprived of these foods, the women testified to feeling "crazy," "awful," "troubled," "irritable," and "worried."

Almost all of the women rejected clay or cornstarch upon completion of pregnancy.

Several women reported that men were also known to have these cravings for strange food. Two were said to eat clay, while one ate cornstarch. This seems to support a theory that some forms of pica may be sex-linked habits.

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CHEMISTRY

New Reactor May Make Commercial Chemicals

COMMERCIAL chemical products, such as ethylene glycol, can be made in a new type nuclear reactor at a cost competitive with conventional chemical manufacture.

Hercules Powder Company, Wilmington, Del., developer of the reactor design, says that it could make possible the first peacetime application of atomic energy capable of competing with standard chemical manufacturing techniques.

Nuclear reactors have been used to produce electrical or thermal power, but at a cost in excess of conventional methods. Chemical materials have also been made by radiation in a reactor, but the cost, using existing reactor designs, has been prohibitive.

Hercules research has been directed toward utilization of the fragment recoil energy of nuclear fission, which constitutes about 80% of the total fission energy. Normally, this energy is absorbed in the fissionable fuel and its container. In special types of nuclear reactors with finely divided fuel, however, this energy is available for chemical transformation. After the chemical synthesis, most of the energy is still available for electrical or thermal power generation.

The company believes the reaction is applicable to a wide range of organic chemicals. It was found that chemicals of lower molecular weight tend to give higher yields of easily separable products.

For example, yields of more than 65% of ethylene glycol have been obtained from methanol using the Hercules process.

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VIROLOGY

Isolate "Polyoma" Virus From Mouse Leukemia

A VIRUS has been isolated from a mouse with leukemia that will produce many different tumors in mice and hamsters.

When young mice, rats and hamsters were inoculated, the virus produced heart, lung and kidney sarcomas, and mammary tumors as well as lesions, a team of British scientists reports in the *British Medical Journal* (Dec. 19).

The virus, which is now being studied by electron microscopy, is similar to one isolated earlier by other researchers, report Drs. G. Negroni, R. Dourmashkin and F. C. Chesterman of the Imperial Cancer Research Fund.

Although cell-free extracts of hamster tumors are apparently not infective for newborn or adult hamsters, some virus must be present in these tumors. The researchers explain that these extracts injure mouse embryo cells, and cell-free cultures from these embryo cells will again produce bloody lesions and tumors in hamsters.

The researchers are attempting to relate infectivity of the cultures with the number and type of particles.

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AERONAUTICS

Rocket Booster Re-entry Seen Possible with Flaps

A METHOD for bringing back through the earth's atmosphere rocket casings and cylindrical satellites has been devised.

Drs. Vernard E. Lockwood and Linwood W. McKinney of the National Aeronautics and Space Administration's Langley Research Center, Langley Field, Va., made the wind tunnel tests on which the method is based. It consists of attaching small flaps to tail end of the circular cylinder. These flaps would swing down into position upon re-entry. Two additional flaps would be used for the glide and landing phases.

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PLASTIC JACKET ISOLATOR—Germfree animals in plastic jacket isolators are examined by Prof. Philip Trexler who enters the isolator from below. He wears a plastic jacket and hood, sealed to the rim of a "port hole". This prevents contamination of the germfree atmosphere. The device was developed by Prof. Trexler at the University of Notre Dame's Lobund Laboratories.

AGRICULTURE

Pest Killers Pose Problems

ABOUT a hundred different insect pests throughout the world have now developed resistance to various modern insecticides. New pests have appeared, some beneficial species have been decimated, and many biologists are beginning to believe that chemical methods of pest control are raising almost as many problems as they solve.

Many of the modern insecticides are extremely poisonous to man, scientists were told at the Institute of Biology, London, England. Dr. J. T. Martin of the Plant Nutrition Research Station at Long Ashton, near Bristol, told of some of the precautions that had to be taken to protect farmers and the public. But his account was not a very soothing or encouraging one.

The distribution and use of these poisons in England is not legally controlled and depends entirely on voluntary cooperation. The amounts of insecticide residue which may be left in foodstuffs are not laid down —the only insurance is the code of "safe spraying practice" which the farmer is asked to observe.

The question of laying down legal "tolerances" for insecticide residues is being studied, but techniques for detecting and measuring such residues in food are very difficult, Dr. Martin said. Such experiments take a long time and often a new insecticide is put on the market before the long-term tests were completed.

A. H. Strickland of the Plant Pathology Laboratory, Harpenden, said that in the eastern United States, 22 different sprays were being used to control one serious pest, the codling moth, but the insect seemed to be acquiring resistance faster than scientists could invent new sprays.

Many pests might be effectively controlled by biological methods, by proper timing of cultivation, rotation of crops, drainage, soil conditions and plant nutrition, the scientists indicated.

To underline the warnings given at this conference, the British Ministry of Agriculture has issued instructions to farmers to take extra precautions when using sprays containing arsenic. Four hundred cattle have been poisoned, a woman died and six others were taken seriously ill after drinking water from a farmhouse drinking water supply believed to have been accidentally contaminated with arsenic.

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ROCKETS AND MISSILES

Balloon to Orbit

NEXT SPRING a big, bright "star" moving swiftly through the twilight sky is expected to be visible.

The "star" will be a 100-foot plastic balloon coated with aluminum and inflated in space with four pounds of water vapor.

Successful launching of this first of three balloons will signal the start of the National Aeronautics and Space Administration's "Project Echo." This experiment will be aimed at testing use of a satellite as a big reflector for radio and television waves on a global basis.

The balloon is to be launched at a 50-degree angle to the equator from Cape Canaveral, and NASA said it should be visible in all parts of the United States except Alaska.

However, there is some question as to how long the big balloon may stay in its planned 1,000-mile-high orbit. It is not known if the balloon will circle the earth for years, as is expected of some satellites, or if its size will make it so vulnerable to meteorites and atmospheric drag, even at that altitude, it may complete only a few 120-minute earth orbits.

In this case, NASA broke its own policy of keeping silent on up-coming shots so that communications scientists would have a chance to plan their own experiments using the balloon satellite. NASA itself hopes to establish a radio link between its Jet Propulsion Laboratory's Goldstone tracking station in California and a Bell Telephone Laboratory station at Holmdel, N. J., using the balloon to bounce radio signals between the two stations.

The balloon will pass over all countries lying between 50 degrees north and 50 degreens south latitude. In the Western Hemisphere the balloon thus will sweep as far north as the U.S.-Canadian border and dip as far south as Puerto Santa Cruz near the southern tip of Argentina. In the Eastern Hemisphere, the balloon will swing over Le Havre, France; Prague, Czechoslovakia; Kharkov, Russia (but not Moscow), and dip as far south as Tasmania, south of Australia.

The balloon will be similar to the one shot recently from Wallops Island, Va., in a test seen by hundreds of thousands along the East Coast.

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PHYSIOLOGY

Exact Fertile Period Found for 200 Women

WHEN WOMEN are fertile and how long this fertile period lasts have been pinpointed for some 200 women, a scientist has reported.

Using a standard test for determining the woman's day of ovulation, the individual control month was established, Dr. Edmond J. Farris of the Wistar Institute said. Once the normal ovulation time was known, each of 200 women was artificially inseminated.

The greatest number of conceptions, 80, occurred when insemination was performed two days before the average mid-cycle day, Dr. Farris reported. Altogether the range of dates for successful conceptions was from cycle days ten to 20 inclusive for menstrual cycles that varied from 20 to 43 days. Ninety-eight percent occurred on cycle days ten to 16.

In conclusion, Dr. Farris observed that the ovulation day is predicted at about two days before the mid-cycle days. The fertile period may extend from two days before to five days following this day, giving a total of eight fertile days.

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AERONAUTICS

Three Practical Fields Foreseen for New Science

PROPULSION devices for space vehicles is one of the three fields in which the new science of magnetofluidmechanics can be expected to have practical applications in the next ten years, one of the world's top scientists reported.

Dr. Theodore von Karman of NATO's Advisory Group on Aeronautical Research and Development, Paris, said the other two fields are containment, in the hope of controlling the energy of nuclear fusion, and flow modification.

Dr. von Karman's report was made at a symposium on the dynamics of conducting gases sponsored by the American Rocket Society and Northwestern University. He said the propulsion devices could take many forms, including:

1. Ion propulsion, based on the electrostatic acceleration of charged elementary particles.

2. Electrostatic acceleration of charged particles of colloid size.

3. Plasma acceleration.

He said that some of the methods suggested for the direct conversion of heat into electromagnetic energy can be considered as applications of magnetofluidmechanics.

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ENGINEERING

Radar-TV Unites to Give Air Traffic Controller

A UNION of television and radar has produced a way of keeping tabs on airplanes flying around airports.

At the Naval Air Station, Virginia Beach, Va., the new Spanrad system was installed to meet air traffic control problems of the jet age. The system has two elements: 1. a radar which scans the skies for spotting planes and 2. a television camera which photographs a map of the area. An attendant moves little plastic models over the map by hand to indicate plane positions.

The radar picture is superimposed over the television picture and the result is shown on a TV screen. Result: A picture showing a map of the area with markers showing where each plane is supposed to be, plus radar blips showing where each airplane actually is.

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PUBLIC HEALTH

Dog May Transmit Disease

A SICK DOG may have been responsible for the death of a man following a month-long bout with the disease North American blastomycosis.

The circumstantial evidence points to the transmission of the relatively rare disease from dog to human, a team of University of Minnesota researchers reports in the *Journal of the American Medical Association* (**171**, 2185, Dec. 19, 1959).

They suggest that the incidence of this disease is probably greater than realized and that physicians might investigate the relationship between the disease in animals and man. Some 16 cases of blastomycosis had been reported in the veterinary literature as of 1952. The total has since risen to 77, Drs. Robert M. Schwartzman, Ramon M. Fusaro and Milton Orkin point out.

The disease organism, *Blastomyces dermatitidis*, appears to be identical in several respects for man and dog; it does not spread from man to man. In support of the disease's transmission from dog to man, the researchers say both cases occurred in a small community. Also, the canine infection preceded the human by three months and friends of the patient owned the involved dog.

Both cases were similar as far as symptoms were concerned. These included fever and "tiredness," cough, difficult or labored breathing, skin lesions and ulcers. In both patients, examination showed lung nodules and the presence of granulomas.

Examination of the family that owned the dog was not too informative, the researchers report. However, the mother did show a positive blastomycin skin test as might be expected since she fed the dog.

It is imperative, they conclude, that when a physician diagnoses North American blastomycosis in a patient, he follow this up with a request for a veterinarian to examine thoroughly pets and livestock for the disease.

Science News Letter, January 2, 1960

GENERAL SCIENCE

Air Force Takes Guess Out of Fitting Clothes

THE AIR FORCE has taken a sharp look at 4,000 men and devised a sizing system for flight clothing that eliminates extreme misfits.

Based only on the relationship between a man's height and weight, the new sizing system has already proved itself workable in experimental tests. Using partial-pressure suits, "get-me-down" protective suits and anti-gravity suits, Air Force researchers properly fitted 96% of 226 men by knowing only their heights and weights.

Proper fitting of these skin-tight suits is critical. A poor fit could spell disaster for the wearer under today's high-speed, high-altitude flight conditions.

The sizing system was worked out by Irvin Emanuel and Milton Alexander of the Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio, and Edmund Churchill and Bruce Truett of Antioch College.

The experimenters said the height-weight system gives a better fit for the crewman, from both protective and comfort standpoint, for two reasons. First, the fit no longer "depends on the fitter's questionable skill as an anthropometrist." Second, the sizing information compiled in the study will give clothes designers a more accurate knowledge of body proportions and their variability.

Other advantages cited: simpler garments, better fits while in the field, minimum alterations with a saving in money, fewer sizes needed for some garments, and easier to keep the right stocks on hand.

Test results on the MC-4A, a partial pressure suit, showed that 43 of 48 men were properly fitted to receive protection by the suits at altitudes of 65,000 feet or above. The men ranged in age from 19 to 44 years old, in height from five feet four inches to six feet four inches and in weight from 123 to 225 pounds. Three of the remaining five "unfitted" men were fitted with suits one size larger, and the remaining two men were judged to be improperly fitted. Alterations were required to fit one of these two men, and the other was fitted with an extra-long large suit that he said was uncomfortable.

Science News Letter, January 2, 1960

SUN-PROOF IGLOO—A rigid polyurethane plastic foam igloo developed by the Atlantic Research Corporation and the Army Quartermaster Corps can be used as a low cost and disposable field shelter for troops. The foam is sprayed on the spot from easily portable ingredients onto an inflated canvas hemisphere. The self-rising foam hardens in less than one hour to a weather-proof surface. The foam can be cut easily with a bayonet, as was the door shown above. The six-foot high, 12-foot in diameter shelter, which weighs less than 200 pounds, is said to be a better insulator than cork.

ZOOLOGY

Kelp Crab Weaves "Love Nest" of Seaweed

DOES THE kelp crab use seaweed to weave a communal "love nest?"

"Yes," is the answer Drs. Richard Boolootian of the University of California, Los Angeles, and A. C. Giese, A. Farmanfamaian and J. Tucker of Stanford University's Hopkins Marine Station, suspect.

While studying the reproductive habits of the kelp crab, the West Coast zoologists found this species of crab occurred in large numbers only in bundles of kelp in which stalks had been woven together.

It is possible that the weaving was the result of wave action, the investigators reported. But the pattern suggests the crabs themselves may have done the weaving.

"The more solid structure of woven bundles of seaweed might tend to attract the crabs in large numbers," Dr. Boolootian said. "Thus mating would be more frequent than that resulting from chance meetings of individual males and females in scattered areas."

The UCLA zoologist said this was the first reported evidence he knew of, suggesting nesting habits in crabs.

Science News Letter, January 2, 1960

MEDICINE

15-Year Study Shows Non-Smokers "Manly"

CHANCES are good that the well-muscled, broad-shouldered "he-man" is not a heavy smoker.

In fact, the stronger a man's "masculinity component" is, the less likely is he to be a heavy or even a moderate smoker, according to results from a 15-year study of some 250 men.

This relationship between an individual's masculinity, "indicated by his external morphological features," and his smoking habits may be very important to studies of lung cancer and coronary heart disease, points out Dr. Carl C. Seltzer of Harvard University's Peabody Museum.

Between 1938 and 1942, 252 college sophomores were examined, subjected to many tests and classified as having a strong, moderate, weak or very weak masculine component. Weakness of this component is significantly more frequent in smokers than in nonsmokers, Dr. Seltzer reports in *Science* (**130,** 1706, Dec. 18, 1959).

"Although these findings are highly interesting and most suggestive," he says, "it must be clearly recognized that they should be considered as preliminary and tentative in nature." The results do suggest that for a specific type of individual smoking may be a reflection of certain personality and behavioral traits which are characteristic of his biological make-up.

In this connection, Dr. Seltzer concludes that it might be possible to obtain evidence on the extent to which smokers and nonsmokers differ in their susceptibility to disease because of their genetically determined biological make-up, apart from smoking itself.

Science News Letter, January 2, 1960

CHEMISTRY

Army Scientists Work on "Muscle Engine"

A CRUDE forerunner of what some day may be a "muscle engine" has emerged from basic research at the U. S. Army's Frankford Arsenal, Philadelphia.

The "muscle" in this engine consists of an organic film that contracts when it comes in contact with an acid, and expands when it comes in contact with an alkali.

In a demonstration, the contracting film was made to lift and lower a cardboard arm resembling the arm of a man. In other demonstrations, the film lifted small weights.

The same chemicals were used repeatedly in demonstrations to make the muscle engine work, Dr. Henry Gisser said. Dr. Gisser is associated in the project with James J. Mikula and Joseph Weisburg.

Dr. Gisser said it is far too early to predict if some day Army tanks may be chemically powered by muscle engines.

He said the project is aimed at finding a way to change chemical energy directly into mechanical energy without going through a heat cycle. The heat cycle imposes a limit on efficiency that can be obtained, he said. If the heat cycle can be eliminated, the efficiency for converting chemical energy into mechanical energy might be raised.

Officially called "synthesis of polyelectrolytes for contractile films," the research already has proved so successful that further funds are to be spent on it in 1960.

Development of this muscle-engine idea comes within the scope of the Army's provision for "novel engineering projects." Under Army policy, limited funds are provided for preliminary work on promising novel technical ideas in any area of ordnance engineering. In this case, early research showed the idea had merit.

Science News Letter, January 2, 1960

GENETICS

Mice Genes Show Basis For Alcohol Preference

A MOUSE'S GENES apparently help determine whether he will prefer alcohol to water.

A study of 40 mice, four males and four females for each of five different inbred strains, reveals a "significant strain difference" in alcohol preference, two University of California researchers report.

All five groups were given as much food as they wanted and both water and a 10% ethyl alcohol solution were available. Only one group showed a consistent preference for the alcohol, choosing the alcohol even when the drinking dishes were switched. The mouse's sex did not seem to influence its drinking habits in any group, Drs. Gerald E. McClearn and David A. Rodgers point out in the *Quarterly Journal of Studies on Alcohol* (Dec.).

"The differences between strains suggest that alcohol preference may be determined by genetic differences, and show the usefulness of inbred mice for research on hereditary and environmental influences in alcohol consumption," the scientists conclude.

Science News Letter, January 2, 1960

ASTRONOMY

Discover Flickering Star With Three-hour Period

FLICKER, flicker, little star. Every three hours, back again to what you are.

Such a paraphrase of the well-known jingle would describe the fifth short-period variable star ever discovered. Its light fades, then returns to normal every three hours, Dr. K. D. Abhyankar, of the Kodaikanal Observatory, Madras State, India, has found.

His studies of the light changes in the new, ultrashort-period variable star known as AD CMi, made while at the University of California, are reported in the *Astrophysical Journal* (Nov.) published in Chicago in collaboration with the American Astronomical Society.

Science News Letter, January 2, 1960

IN SCIENCE

ASTRONOMY

Trapped Radiation Belts Seen for Mars and Venus

SUBSTANTIAL belts of trapped radiation such as found around earth may also surround Mars and Venus.

This is the conclusion of Dr. James A. Van Allen of the State University of Iowa, who discovered earth's regions of intense radiation that may prove hazardous to future space travelers. From information gathered by Pioneer IV, which is now in orbit around the sun, and from previous data, Dr. Van Allen has found that magnetic trapping of charged particles near planets is probably quite common.

He believes it is quite common for neutrons produced by cosmic ray bombardment to move outward from the atmospheres or solid surfaces of planets, as they are believed to do from earth, to form an inner radiation belt. Also, all bodies of the solar system are bombarded by clouds of radiation thrown out by the sun. This is the radiation believed responsible for the earth's outer radiation belt.

Dr. Van Allen concludes that both of these two important sources of trapped radiation are present throughout the solar system. The greater the magnetic moment and the less extended the atmosphere, the more favorable are conditions for a high intensity of trapped radiation.

Dr. Van Allen's report appears in the *IGY Bulletin* (Dec.), a publication of the National Academy of Sciences.

Science News Letter, January 2, 1960

ROCKETS AND MISSILES

Sun and Moon Increased Lifetimes of Satellites

THE LIFETIMES of earth satellites with highly elliptical orbits can be increased by the influence of the sun and moon.

Three scientists at the National Aeronautics and Space Administration's Goddard Space Flight Center, Washington, have calculated that the perigee height of satellites with highly elliptical orbits can be increased more than half a mile a day for a period of several months by a careful selection of launching conditions.

A satellite with an apogee height (farthest distance from earth) of about 28,000 miles and a perigee height (closest distance to earth) of about 4,000 miles, similar to that of Explorer VI, would show an increase in perigee height of sixtenths of a mile a day if it were launched on Feb. 1, 1960.

The calculations of solar and lunar effects on satellite orbits by Drs. E. Upton, A. Bailie and P. Musen are reported in *Science* (**130,** 1710, Dec. 18, 1959).

Science News Letter, January 2, 1960

E FIELDS

EVOLUTION

Foresee Man's Extinction As Not Very Likely

MAN will probably do better than the dinosaurs when it comes to survival.

In a changing and largely self-made environment, man no longer relies on natural selection, the undoing of the dinosaurs, two scientists point out in a report by the Smithsonian Institution.

Dire predictions that mankind is on the way downhill, perhaps even on the road to extinction, probably are unjustified, say Drs. Theodosius Dobzhansky of Columbia University and Gordon Allen of the New York Psychiatric Institute. While man is definitely losing some of the qualities, both physical and mental, which enabled him to survive in earlier times, these losses do not necessarily mean his extinction as some scientists have suggested.

The great error in assessing man's future is to evaluate his hereditary characteristics without fully considering environment, the two geneticists report.

The idea that the human species would do fine if all obstructions to natural selection were removed does not stand critical examination, Drs. Dobzhansky and Allen conclude.

"Natural selections cannot maintain the adaptiveness of human populations to environments which no longer exist, nor can it pre-adapt them to environments of the future.

"After all," the scientists say, "extinction has been the fate of countless biological species which lived in the state of nature and which were at all times subject to natural selection."

Culture is man's novel method of adapting to his environment—a method by which he has reached a "solitary pinnacle of evolutionary success," the scientists conclude.

Science News Letter, January 2, 1960

ENGINEERING

Training to Avoid "Radar-Aided" Crashes

SEA CAPTAINS can now go to school to recognize in advance the conditions which created the situation leading to the collision between the "Stockholm" and the "Andrea Doria." Both those liners were being steered by radar and the inquiry after the collision revealed that both ships could see each other on the radar sets.

An intensive five-days' course at the Sir John Cass College, in London, gives ships' masters experience in learning the tricks and quirks of radar and teaches them, in the words of cynical skippers, how to avoid "radar-aided" crashes.

The pupil-captains already have commands of their own and all are well versed in radar technique. Each week six captains meet for training.

The captains are paired off, one acting as captain of the simulated ship and the second as his chief officer. The basis of their training is a series of voyages across the two radar screens of a comprehensive simulator unit. The simulator is adjusted to give responses closely equivalent to the top speed, stopping time and turning circle of each ship.

Five other vessels on different courses are shown to be in the neighborhood and, in a theoretical thick fog, the captains must pick their way through in safety.

To complicate the voyage, an imaginary and intricate coastline is also fed on to the radar screens. A particular favorite is the Straits of Gibraltar.

According to Capt. M. W. M. Weekes, the instructor in charge of the course, only one collision has occurred so far, although the simulator has no physical reaction—no clanging bells or ships' sirens blowing—if a mistake is made. Nor is there a simulated crash if a collision does occur. "After all, the men taking these courses are all skilled mariners and know what they are about. They are not playing at navigating a ship."

Science News Letter, January 2, 1960

PHYSIOLOGY

Drinking Is Riskier On an Empty Stomach

THE MAN who drinks on an empty stomach is more likely to "feel his drinks" than the man who eats before he imbibes.

Food in the stomach not only cuts down the amount of alcohol taken into the bloodstream, but also provides heavy drinkers with protective foods, Prof. Harrison M. Trice of the New York State School of Industrial Relations at Cornell University reported.

He told a group of club managers and restaurateurs that, on an empty stomach, a 180-pound man can become legally intoxicated after two or three straight shots of 80-proof alcohol. After eating dinner, however, it would take five such drinks to show the same amount of alcohol in the blood.

Food such as steak, salads with oil dressing, and butter slow down the stomach's absorption of alcohol, he said.

Prof. Trice advised restaurateurs to make every effort to feed problem drinkers before serving them too many drinks.

He defined an alcoholic as a person whose family and work relations have been disrupted because he cannot control his drinking habits. Most alcoholics are 30 to 50 years of age, he said, and only 15% are older than 50. Men outnumber women about five to one.

Usually, seven to ten years of steadily increased drinking are required before the problem drinker reaches physical collapse. Prof. Trice pointed out that much depends on the person's physical condition and how concentrated his drinking is—whether he drinks a quart a day all at once or whether he spreads out his consumption.

Science News Letter, January 2, 1960

BIOLOGY

Ocean Grass "Meadows" Found Off Panama

DISCOVERY along Pacific Central America of "meadows" of marine grasses and of reefs formed of calcareous seaweeds has been reported by the Beaudette Foundation for Biological Research, Solvang, Calif.

The grass meadows were found on shallow sand and silt bottoms from central Panama to at least as far north as Corinto, Nicaragua. Serving as grazing grounds for sea turtles, such beds had not previously been known to occur in the eastern Pacific.

Neither had reef-building coralline algae of the type associated with corals in atolls throughout the tropical Pacific been previously reported to occur along the Pacific Central American coast. But at Isla del Cano, Costa Rica, reefs were observed in which these binding and pavement-forming algae were prominent among the corals.

Although several species of massive algae were found that were capable of extensive reef formation, their limitations seemed to be due to relatively rapid solution that probably prevents accumulation of large calcareous formations.

These discoveries were made by an expedition of the vessel Stella Polaris along the Pacific coast from Panama to southern Mexico.

It was also discovered that large amounts of agar-producing seaweeds are found in estuaries along Costa Rica and Nicaragua, and that the major development of benthic marine vegetation in Pacific Central America is confined to the summer season of storms and rains. Previous biological expeditions had not ventured out to make collections during this season.

Science News Letter, January 2, 1960

VIROLOGY

Rabbit Virus Found in California Wild Rabbits

A VIRUS disease that helps Australians check their troublesome rabbit population has been detected recently in wild rabbits in California.

Known as myxomatosis, the disease has little effect on American wild rabbits but is usually fatal to European wild rabbits. The latter include all American domestic rabbits as well as the introduced varieties that have run rampant in Australia.

Evidence of the mosquito-borne disease was discovered in California cottontails and brush rabbits by I. D. Marshall, research fellow at the Australian National University now at the School of Public Health, Berkeley, Calif. The discovery followed outbreaks last August among domestic rabbits near San Diego and Palo Alto.

Mr. Marshall is trying to learn more about the disease in order to promote its spread in Australia, where it benefits agriculture, and to prevent its spread in California, where it is a menace to the domestic rabbit industry.

Science News Letter, January 2, 1960

GENERAL SCIENCE

Science Forecast of 1960

New probings of atom, new nuclear power production, first man in space foreseen for coming year. Space probes will go to vicinities of moon, Mars and Venus.

See Front Cover

By WATSON DAVIS

THE YEAR 1960 will see significant events in atomic power, probings of the atom and spectacular adventures into space. It will be a year of fulfillment in major efforts that began several years ago.

In less physical research, continued efforts will be fruitful. Discoveries relating to human origins and ancient man promise to bring revisions in our detailed ideas about evolution, while from China, the Mediterranean region and Africa there will probably be new finds of significance. The relationship of the East African ancient man-like creature, Zinjanthropus, discovered in 1959, to another possible human progenitor, Australopithecus, will be determined.

Medically, the big hope will be to turn up among the thousands of drugs being tested on animals a chemotherapeutic agent of promise in controlling cancer. We may hear something of attempts to immunize against some diseases now checked by antibiotics or chemicals.

Mice For Research

The photograph on the cover of this week's SCIENCE NEWS LETTER shows one of the 100,000 mice which Lederle Laboratories uses annually in its cancer research program. The mice are "grown" at a special farm in Wyckoff, N. J.

In the promising studies of complex chemicals in growing cells and the mechanisms of reproduction, biochemists may come closer to delineating the organization of the life processes, so basic to understanding healthy growth and disease processes.

These are some of the broad fields in which 1960 progress seems to be likely. There are always unpredictable breakthroughs that may occur on the far-flung and augmented scientific effort in other parts of the world, notably Russia, as well as the United States.

The time has not yet arrived when atomic power from fission of elements, principally uranium, will furnish a major part of our power, but more giant reactors will begin work here and abroad and the intensive program of nuclear-powered submarines continues under full fission. The Dresden reactor at Morris, Ill., will join the two-year-old Shippingport, Pa., atomic power station in full power operation, while two other power reactors, the Enrico Fermi plant at Lagoona Beach, Mich., and the Yankee Atomic Electric Co. installations at Rowe, Mass., will both go critical. This will bring 440,000 electric kilowatts of power into actual production or on the verge of it. The nuclear ship Savannah will start up its reactors during the year. A couple of dozen U. S. nuclear submarines are being constructed. Britain and Russia, too, are having atomic power plants come into production and the first U. S.-built (Westinghouse) power reactor in a foreign country will go critical in 1960 at Mol, Belgium.

There will continue to be apprehension as to the safe disposal of the radioactive wastes of such power plants, and this problem, like atomic test explosions with their fallout danger, will have international attention.

The ban on atomic explosions will probably continue during the year although there may be an internationally conducted test to demonstrate that a small underground blast can be detected by the proposed monitoring system.

The progress in 1959 toward a controlled hydrogen bomb reaction for power purposes does not give promise that this will be achieved in 1960, although the extensive research in progress may prove productive.

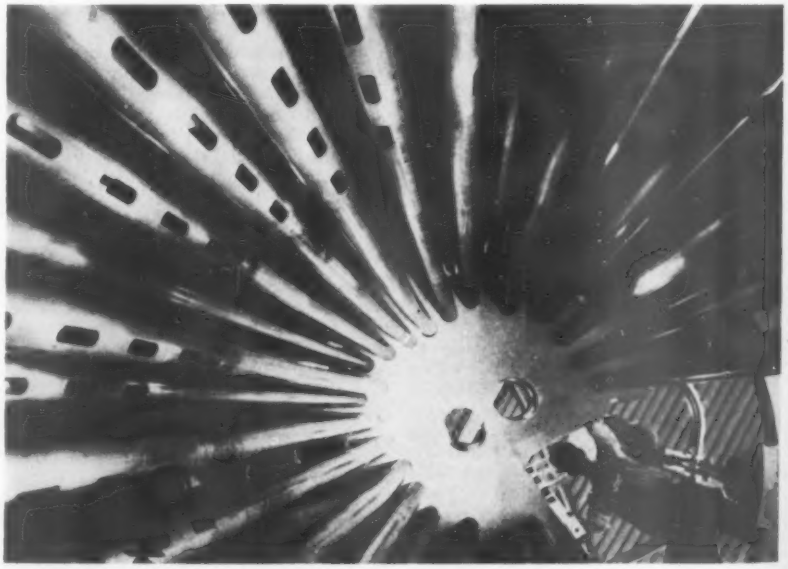
Gigantic atomic accelerations for research on the fundamental atomic particles are being built and these may discover facts about the constitution of matter that will give new clues to tapping matter for practical power just as uranium fission ushered in the atomic age. Super accelerators in the range of billions of electron-volts are being constructed at Brookhaven on Long Island, N. Y. (30 bev protons), CERN at Geneva (30 bev protons), Argonne, Ill. (12.5 bev protons), U.S.S.R. (7 bev protons), Cambridge, Mass. (6 bev electrons) and Princeton (2 bev protons). Two or three of these machines will be completed in 1960 and scientists will start the search for new information about the basic forces and particles of matter. Some of these should create researchable quantities of anti-matter, particles that differ so in nature from the ordinary matter we know that they annihilate it in a gigantic flash of energy.

Hop Into Orbit

Man's penetration into space will continue. It is possible that a man will make the first short hop into an orbit around the earth in 1960. He may be an American or a Russian.

Rockets to the vicinity of the planets, Mars and Venus, will carry observing instruments, and there will continue to be probes toward the moon. Better pictures of the hidden side should be obtained.

Among some two dozen space shots scheduled by the United States, one will launch a hundred-foot balloon satellite that



INSIDE REACTOR TO BEGIN POWER PRODUCTION IN 1960—A view of the interior of the pressurized water atomic power plant that will go critical in 1960. Producing 110,000 kilowatts of electricity, it is being designed by Westinghouse at Rowe, Mass., for the Yankee Atomic Electric Co.

will be used as a relay point for TV. It will shine like a bright star.

More image converters, electronic TV-like devices, will be attached to more big telescopes to improve man's observing power for viewing the distant universe. These will be applied to infrared spectroscopy and to the photographic measurement of very close double stars.

For more information about the universe as signaled by radio waves originating in various parts of the universe, two new 85-foot antennae of radio telescopes will go into service.

From a satellite there will be observations of X-ray-like cosmic radiations from space that outline structures of the universe different from those shown by light and radio.

With detectors of streams of particles from the sun installed in the polar regions, there will be better forecasts of interruptions of long distance radio communications, based on the concept that the fast solar particles from flares on the sun get to the earth near the poles, while the slow ones cause the world-wide auroral and communication disturbances.

The radiation belts discovered high above the earth will be further observed to find out whether there are several bands or just one with varying zones of intensity. The suspected connection between radiation belts and magnetic disturbances will be explored.

Weather maps will be extended still higher by mapping the ionosphere at fixed heights. There will be continued improvement of the long-range 30-day forecasts through use of progressing numerical computing techniques.

From the discovery of the triple chromosome pattern there promises to come explanations of some abnormalities like mongoloidism and possibly the origin of stillbirths, some miscarriages and some mental retardation.

Some psychiatrists are still searching for a safe and nontoxic energizing drug that speeds up human activity just as tranquilizers slow it down. This "anti-lethargy pill" would be a running mate to the psychiatric use of the drugs that have helped the management of the mentally ill. There is still need in the case of institutionalized mental patients for further development of "halfway houses," sheltered workshops and nursing homes to supplement the usual mental hospitals.

The attempt will continue to increase the effectiveness of science education at all levels to produce more scientists and technologists needed by the world, but it may become evident in the coming year that there is some fear that undue attention is given to the small fraction that is judged mentally superior.

The science forecast for 1959 made by Watson Davis, director of SCIENCE SERVICE, and issued a year ago was fulfilled in many respects.

There were rocket probes carrying instruments that reached beyond the moon, as predicted. Two of these space shots, one U. S. and other U. S. S. R., reached the vicinity of the sun and became artificial planets.

The moon, as foreseen, was the prime space target. Accomplishment in lunar rocketry exceeded the expected as a result of Soviet rockets hitting the moon and getting an electronic view of its hidden side.

Not only was there exploration of the radiation belt around the earth that was discovered in 1958, but another one was found and U. S. A. space probes brought back information about these possible barriers to space travel by men.

Enhanced effectiveness of the world's second largest telescope, the 120-inch on Mt. Hamilton, Calif., was obtained by use of an electronic image tube, as predicted, when this new telescope went into service.

While a gigantic program of cancer research, seeking a chemotherapeutic agent effective against malignancies, continued, there was no breakthrough as had been earlier considered a possibility, not a probability.

The experimental plane X-15 did make its first test flights as foreseen.

Science News Letter, January 2, 1960

PUBLIC SAFETY

FAA Retires Pilots 60 Years or Older in March

AIR-LINE pilots aged 60 or more must retire beginning March 15, 1960, according to a new Federal Government law.

There are now approximately 40 pilots of this age or older, Federal Aviation Agency Administrator, E. R. Quesada, has reported.

Mr. Quesada pointed out that in the absence of any regulation to the contrary, the growing number of pilots aged 60 and over would substantially increase during the next five years with some reaching the 65 to 70 category. In the next eight years approximately 250 air-line pilots will have reached the age of 60.

The FAA regulation is based on medical facts that clearly establish that sudden incapacitation, due primarily to heart attack and strokes resulting from deterioration of physiological and psychological functions, becomes significantly more frequent in any group reaching age 60, and such attacks cannot be predicted on an individual basis by prior medical examinations, an official statement read.

The Agency stated that because of deterioration of these functions, which normally occur with age, allowing pilots in this age group to fly airplanes that carry up to 165 passengers at speeds of 550 miles per hour would be hazardous.

Older pilots now fly the largest, highest-performance aircraft, carrying the greatest number of passengers over the longest nonstop distances, operating into and out of the most congested airports near the largest cities, and traveling in flight in and through traffic lanes with the highest density of air traffic.

Science News Letter, January 2, 1960

ENGINEERING

USSR Engineers Try Tuned Transmission Lines

RUSSIAN electrical engineers are experimenting with "tuned" power lines for carrying large blocks of power 1,500 to 1,900 miles from Siberia to the Ural Mountain area.

By loading a long transmission line much as radio engineers load transmitting antennas, the Russians hope to achieve better efficiency in transmitting electricity from an area having good power generation resources to a power-deficient area.

Tuned transmission lines are not used in the United States. Most U. S. transmission lines are relatively short and voltage on the line end is regulated easily by applying condensers or inductances as needed.

Electricity experts in Washington, however, believe that the tuning of a transmission line would be similar to techniques used in the U. S. for adjusting voltage at the end of the line.

The tuned transmission-line experiments are being carried out at the Siberian Branch of the USSR Academy of Sciences' Electric Power Systems Laboratory under direction of Prof. Shcherbakov. But S. P. Khatskevich of the Novosibirsk Electrical Engineering Institute reported that the problem of tapping a long line at points along its length, without disturbing the whole line, has not been fully solved. Intermediate line taps cause large voltage fluctuations in the whole line.

News of the experiments was revealed in *Scientific Information Report* (Oct., 1959) prepared by the Central Intelligence Agency and circulated by the Department of Commerce.

Science News Letter, January 2, 1960

CHEMISTRY

Scientists Stress Use of Computers in Chemistry

COMPUTERS are among the most effective classroom and laboratory demonstration aids, scientists at the San Francisco meeting of the American Institute of Chemical Engineers learned.

"The analogue computer has shown itself to be an excellent teaching aid in presenting the dynamic behavior of physical and chemical systems," said Theodore J. Williams and Verlin A. Lauher of the Monsanto Chemical Company, St. Louis. They went on to explain how it can be wired to simulate, or become electronic models of, many physical and physical-chemical systems, so that the model is more vivid than the experiment itself.

J. W. Tierney of Remington Rand Univac, St. Paul, Minn., said the digital computer "has become an important aid in chemical engineering calculation." He stressed that students of engineering should be taught the proper use of computers along with the other calculation tools available.

Science News Letter, January 2, 1960

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, priced at 95¢ or over, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVANCES IN CARBOHYDRATE CHEMISTRY, Vol. 14—Melville L. Wolfrom and R. Stuart Tipson, Eds.—*Academic*, 526 p., $15. Covers the Maillard reaction, cyclitols, amino sugars, pyrimidine nucleosides and hemicelluloses.

THE APPLICATION OF GENETICS TO COTTON IMPROVEMENT—Sir Joseph Hutchinson—*Cambridge Univ. Press*, 87 p., $3. Discusses findings of the last fifty years.

BEYOND THE MOUNTAINS OF THE MOON—The Lives of Four Africans—Edward H. Winter—*Univ. of Ill. Press*, 276 p., illus., $5.50. Anthropologist took down verbatim the life histories of four members of the Amba tribe in a remote part of Uganda.

THE CHEMISTRY OF PLANT GUMS AND MUCILAGES AND SOME RELATED POLYSACCHARIDES—F. Smith and R. Montgomery—*Reinhold*, 627 p., $18. Comprehensive monograph.

CLASSIFICATION AND INDEXING IN SCIENCE—B. C. Vickery, introd. by D. J. Foskett—*Academic*, 2nd rev. ed., 235 p., $6.00. British study of methodology, explores modern techniques of subject analysis and mechanisms used for retrieval.

DATA BOOK ON PHYSICAL AND ENGINEERING PROPERTIES OF MATERIALS FOR NUCLEAR FUEL ELEMENTS — Henry H. Hausner — *Sylvania-Corning Nuclear Corp.*, 55 p., paper, $1. For nuclear fuel engineers and reactor designers.

DICTIONARY OF ATOMIC TERMINOLOGY—Lore Lettenmeyer, Ed.—*Philosophical Lib.*, 298 p., $6. English, German, French and Italian terms in parallel columns, indexed in each language.

AN ECOLOGICAL SURVEY OF THE POTOMAC AND ANACOSTIA RIVERS WITH SPECIAL EMPHASIS ON POLLUTION: A Dissertation—Martha C. Bradley—*Catholic Univ. of Am. Press*, 33 p., illus., paper, 75¢.

ELECTROLYTIC MANUFACTURE OF CHEMICALS FROM SALT—D. W. F. Hardie—*Oxford Univ. Press*, 74 p., illus., $1.20. British textbook.

ESSAYS IN INDIVIDUAL PSYCHOLOGY: Contemporary Applications of Alfred Adler's Theories—Kurt A. Adler and Danica Deutsch, Eds.—*Grove Press*, 480 p., $6.50; paper, $2.95. Essays on theoretical principles, psychotherapeutic procedures and case histories.

GERMAN SECRET WEAPONS OF THE SECOND WORLD WAR—Rudolph Lusar, transl. from German by R. P. Heller and M. Schindler—*Philosophical Lib.*, 264 p., illus., $10. Presents technical data of German weapons development and research.

HYDROLOGY—C. O. Wisler & E. F. Brater—*John Wiley*, 2nd ed., 408 p., illus., $9.25. Two chapters about semiarid basins and effects of snow have been added.

INTRODUCTION TO THE STUDY OF ANIMAL PARASITES AND PARASITISM—William A. Riley and Franklin G. Wallace—*Burgess*, 7th ed., 120 p., paper, $2.75. Syllabus for students.

JOHN DEWEY: MASTER EDUCATOR—William W. Brickman and Stanley Lehrer, Eds.—*Soc. for the Advancement of Educ.*, 123 p., $2.50; paper, $1.95. 100th anniversary reference volume.

JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS: B. Mathematics and Mathematical Physics, Vol. 63B, No. 1—C. H. Page, Ed.—*NBS (GPO)*, 72 p., paper, 75¢; quarterly, $2.25 a year.

JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS: C. Engineering and Instrumentation, Vol. 63C, No. 1—W. A. Wildhack, Ed.—*NBS (GPO)*, 85 p., illus., paper, 75¢; quarterly, $2.25 a year. Reports research and development results.

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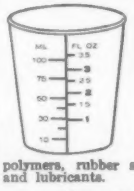

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PSYCHOLOGY

You Blush Because You Love the Truth

A BLUSH does not betray a sense of shame at the truth, but rather a feeling of shame that we have concealed the truth.

This interpretation of a red face was given to the American Psychoanalytic Association meeting in New York, by Dr. Sandor S. Feldman of the University of Rochester Medical Center, Rochester, N. Y.

Blushing can be observed in both sexes and all races. In people of dark skin, the blush does not look red; it makes the skin darker. Blushing occurs in persons who live nude. And persons who were born blind blush like those with eyesight.

The blush is proof that there is a basic tendency for truth, Dr. Feldman said. If truth is hidden, it appears as redness on the face.

Children represent the truth and they are not ashamed. They begin to be ashamed and to blush when hypocrisy is imposed upon them and they are taught to conceal the truth.

Several decades ago, Dr. Feldman pointed out, women were expected to be bashful and to blush at the slightest violation of etiquette, but when men blushed it was considered as weakness. Today women are not expected to blush and when men blush it is considered as rather charming.

Science News Letter, January 2, 1960

ASTRONOMY

Astronomer Believes Moon's Surface Is Slag

A RUSSIAN astronomer is convinced the moon's surface is composed of a porous material that resembles slag from volcanoes but that forms when the rocks of the lunar crust are smashed by meteors.

Prof. N. N. Sytinskaya of the Main Astronomical Observatory of the U.S.S.R. Academy of Sciences reports her conclusion is based on "photometric, colorimetric and polarimetric investigations of the moon." It was made before the recent Russian moon shots, one of which landed on the moon and the other of which circled the moon to take photographs of the previously unseen side.

Prof. Sytinskaya says the lunar atmosphere, if it exists at all, is so extremely thin that even very tiny micrometeorites reach the surface with velocities sufficiently high to cause explosions. The micrometeorites blast the surface at the rate of two and a half each square inch each minute. Therefore, she concludes, the action of micrometeorites alone is sufficient for the "formation on the lunar surface of a continuous film of modified material during a very short time."

The resulting slag material is dark-colored due to the breakdown of silicates and the formation of black iron oxides, she reports in *Soviet Astronomy*, a translation issued by the American Institute of Physics of the Russian publication, *Astronomical Journal*.

The lunar maria, or seas, Prof. Sytinskaya says, are darker than the "continents" because the original rocks of the maria contain a higher proportion of iron.

Prof. Sytinskaya considers that the slag layer in the region of the maria is mainly formed on top of ultrabasic rocks, while in the regions of the "continents" it is mainly formed over basic and possibly in part over intermediate rocks.

Science News Letter, January 2, 1960

MEDICINE

Sterilized Bone Bank Established in West

THE FIRST BONE BANK in the western United States has been established at the University of California at Los Angeles.

Radiation-sterilized bone from deceased persons is preserved in a freezer to help repair the bones of the living. Bones are taken during autopsy from suitable donors upon written consent of relatives.

The UCLA bone bank is under the direction of Dr. Leonard Marmor.

Science News Letter, January 2, 1960

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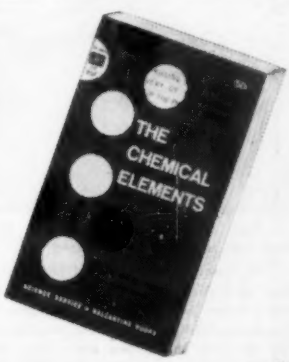

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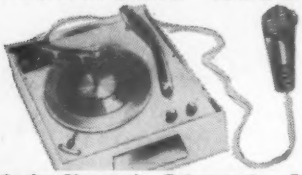

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Questions

ASTRONOMY—How many short-period, variable stars have been discovered? p. 8.

BIOLOGY—What countries touch upon the grassy "meadows" of the Pacific? p. 6.

NUTRITION—What nutrients do clay and cornstarch supply to an inadequate diet? p. 5.

PUBLIC HEALTH—What percentage of veterans are said to be receiving medical care for disabilities not received during service? p. 3.

ZOOLOGY—How could a seaweed nest benefit the kelp crab? p. 7.

Photographs: Cover, American Cyanamid Company-Lederle Laboratories; p. 3, National Bureau of Standards; p. 5, University of Notre Dame; p. 7, Atlantic Research Corporation; p. 10, Westinghouse Electric Corporation; p. 16, E. I. DuPont Company.

Do You Know

A solar flare, one of a group of phenomena comprising "solar activity," is a sudden, short-lived brightening of the solar surface in the neighborhood of a sunspot.

The *screwworm* in the past has caused a loss to agriculture in the U. S. conservatively estimated at $20,000,000 in the Southeast and $25,000,000 to $35,000,000 in the Southwest.

The National Institutes of Health awarded 1,040 *research grants* and 165 fellowships totaling $18,573,592 during October, 1959.

Rats rarely forage for food or water more than 100 feet from their nesting or hiding places.

A form of *typhus fever* is the primary rat-borne disease in the U.S.

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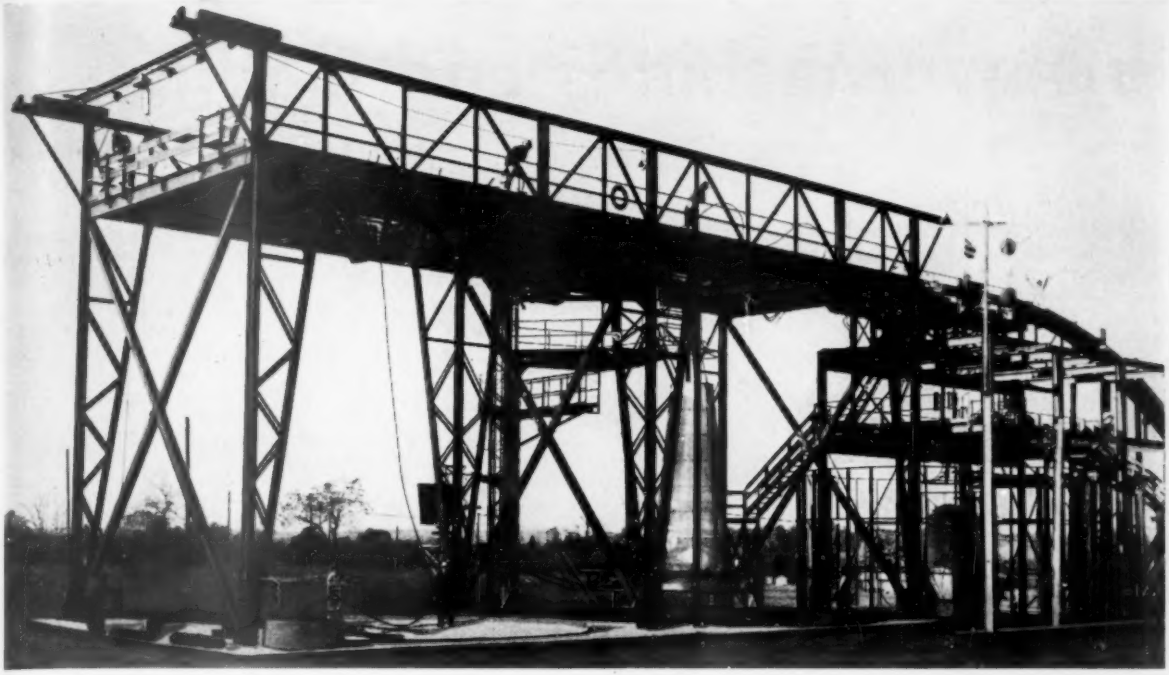


SHIP WITHOUT AN OCEAN

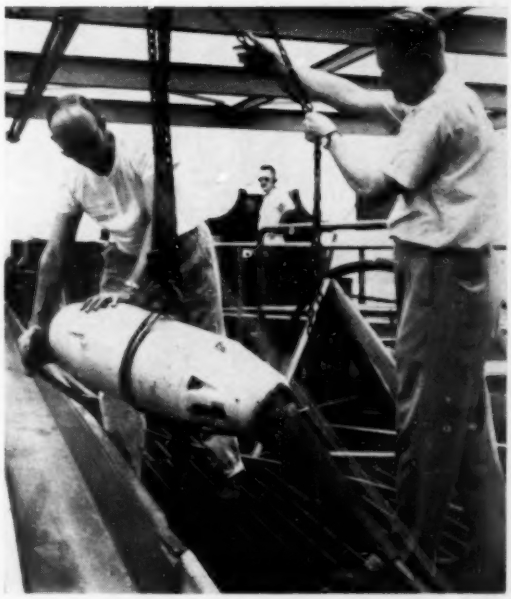
How do you lay a cable on the ocean floor—a cable that is connected to scores of large, heavy amplifiers? How do you "overboard" such a system in a continuous operation, without once halting the cable ship?

Bell Telephone Laboratories engineers must answer these questions in order to lay a new deep-sea telephone system designed to carry many more simultaneous conversations. They're experimenting on dry land because it is easier and more economical than on a ship. Ideas that couldn't even be attempted at sea are safely tested and evaluated.

In one experiment, they use a mock-up of the storage tank area of a cable ship (above). Here, they learn how amplifiers (see photo right), too rigid and heavy to be stored with the cable coils *below* decks, must be positioned *on* deck for trouble-free handling and overboarding.

Elsewhere in the Laboratories, engineers learn how best to grip the cable and control its speed, what happens as the cable with its amplifiers falls through the sea, and how fast it must be payed out to snugly fit the ocean floor. Oceanographic studies reveal the hills and valleys which will be encountered. Studies with naval architects show how the findings can be best put to work in actual cable ships.

This work is typical of the research and development effort that goes on at Bell Laboratories to bring you more and better communications services.



Experimental amplifier about to be "launched" from "cable ship." Like a giant string of beads, amplifiers and connecting cable must be overboarded without stopping the ship.

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Science News Letter, January 2, 1960

PORTABLE STEEL DOLLY, designed specifically to move supply or refuse cans up to 20 inches in diameter, has a weight capacity of 300 pounds. Its cross members are made of ⅛-inch by 3-inch rust-resistant cadmium-plated hard rolled steel.

Science News Letter, January 2, 1960

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Science News Letter, January 2, 1960

PLASTIC BUCKETS, shown in the photograph, of the same basic design have six different uses and have decorations appropriate to each use. Each has a hinged, snap-on cover, is light in weight and easy

to clean. The units include a briquette scuttle, picnic basket, cooler, garden tool chest, diaper pail, and a mop bucket or pouring pail. They nest for storage.

Science News Letter, January 2, 1960

SLIDE RULE COMPARATOR lists details on office copying machines made by ten different manufacturers. Designed to help the prospective purchaser select the proper copying equipment, it contains information on machines and paper costs, types of copying processes, number of copies possible per minute and details on ten other categories.

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CARPENTER'S PLANE is only three and a half inches in length and is said to be accurate for fine finishing in close, small work. Its one-inch cutter is made of alloy tool steel and is adjusted with a nickel-plated screw.

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Nature Ramblings

By HORACE LOFTIN

ACCORDING to a popular guide to North American animals, the bobcat or wildcat *(Lynx rufus)* seems to be on his way out. The book describes it as once ranging throughout the United States but "now extirpated in the densely settled parts" of the East. That is the picture I held, too, until I went out in the Florida woods about 15 miles from town with a professional trapper. Within a matter of minutes, he had located the spoor of numerous 'possums, 'coons and foxes and along with them the tracks of two bobcats.

It had only been a few months before this that I saw my first "wild" wildcat in a marsh not far from home. I had thought this to be a rarity. But the hunter assured me that he often takes two or three bobcats a night when he sets his traps especially for them. Since that lesson in woodcraft, I have located many such tracks; seeing a full grown bobcat run across a busy highway a few weeks ago was not such a surprise.

Probably the wildcat is quite a rarity in the environs of the great metropolises of the East. But given a secluded bit of woods, a thick bottomland or swamp where it can avoid man, there the bobcat is holding its own in feline disdain of the surrounding civilization.

Big Cats of America

Another big cat, the Canadian lynx *(Lynx canadensis)* haunts the woods of the North.

This cat is found from Alaska across Canada, southward into the Rockies to Colorado and into Oregon. It also dips southward from Canada into northern New England. The lynx, a lover of colder climates, has been pushed northward from its original range, but it never was so generally distributed as the bobcat.

The mountain lion is known variously as the panther, cougar, catamount and a score of other names, including *Felis concolor* to biologists. It ranges from Patagonia in southern South America to well into the borders of Canada. In the West, this cat is fairly abundant and furnishes big game hunting to sportsmen. To cattlemen, it is often considered more of a pest than a source of sport since it occasionally kills stock.

The "panther," as it is called in Florida, still haunts the remoter woods and swamps of that state in limited numbers. And the talk around pot-bellied stoves in general stores through other regions of the South often centers about the "mountain-lion" rumored to dwell in the local swamps.

Still other big cats are to be found in the U. S. borders close to Mexico. The jaguar *(Felis onca)* of the South American tropics gets into Arizona, New Mexico and Texas. The ocelot *(Felis pardalis)* ranges all the way from Paraguay into the American Southwest.

Science News Letter, January 2, 1960